DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fluid flow sampling systems are now items of major importance for industrial process monitoring in view of recent legislation for environmental control purposes. A system for providing sampling in response to predetermined flow volume passage in an open flow channel is seen in FIG. **1.** As depicted there, the system is mounted in a sewer riser **11** extending between a street level **12** and a sewer flow channel **13.** A manhole cover **14** covers the top of the sewer riser **11.** A flow sampler **16** is suspended by means of a harness **17** from means such as hook **18** attached to the inside wall of sewer riser **11.** An intake **19** is submerged in a body of fluid **21** passing through the sewer channel **13.** A tube **22** is used to communicate intake **19** with the interior of the sampler **16.**

Suspended in a mount **23** immediately beneath the manhole cover **14** is a flow meter **24.** Flow meter **24** has depending therefrom a cable **26** on the end of which is attached a probe **27** for contacting the surface of flow **21.** Means for providing an electrical connection between flow meter **24** and sampler **16** is seen in an electrical cable **28** therebetween.

Turning now to FIG. **2,** the structural characteristics of sampler **16** will be described. A top cover **29,** which may be of vacuformed plastic, is formed with depressions **31** therein to accommodate passage of the strands in the harness **17.** A base plate or framework **32** is formed to receive the cover **29** and appears in this embodiment as an inverted circular pan. Base plate **32** has attached about the periphery conveniently located handles **33** and latches **34.** Mounted on top of base plate **32** is a wet cell storage battery **36** retained thereon by a bracket **37.** A control module **38** is mounted adjacent to battery **36** on base plate **32.** A sample chamber assembly **39** is also mounted on base plate **32.**

Sample storage means **41** is formed for mounting below base plate **32** having thereon hooks **42** for engagement by latches **34.** The embodiment in FIG. **2** shows a plurality of wedge shaped storage containers **43** having open upwardly extending openings **44** positioned at a common radius from the center of storage means **41.** A hold down ring **46** is disposed in sample storage means **41** to secure sample storage contrainers **43** therein. Intake **19** is shown on one end of tube **22,** which in this instance is a pliable plastic tube of approximately ⅛ inch diameter having an adapter **48** on the other end thereof.

Sampler **16** is seen in block diagram form in FIG. **3.** An input signal for initiating the sampler cycle may be received from a suitable source. The signal may be received from a flow meter at terminal **49,** a clock **51,** or may be provided manually by means such as manual switch **52.**

The type of cycle control is adjusted at a mode switch **53** having in this embodiment positions designated as "time", "off", and "flow". Clock **51** is attached to the pole of mode switch **53** which is designated "time", a flow meter is attached to the pole of mode switch **53** designated "flow" and an open position of mode switch **53** is provided for "off" selection. Mode switch **53** is connected to the initiate or start terminal of a power switch **54.** Manual switch **52** is also connected to the start terminal of power switch **54.** Power switch **54** provides an output for energizing a compressor control **56** and for initiating a two-cycle timer **57.** Two-cycle timer **57** is connected to provide signals to a solenoid valve control **58** and to a fill and measurement timer **59.** Output signals from fill and measurement timer **59** are directed to a sample valve control **61** and a final purge control timer **62.** The output from final purge control timer **62** is directed to reset two-cycle timer **57,** and to a multiple sample multiplexing and filling arm drive circuit **63** for providing a predetermined number of samples to be stored in a single storage container such as bottles **43.** The output of final purge control timer **62** is also directed to a multiple container multiplexing circuit **64** for providing a predetermined number of storage containers or bottles **43** to receive portions of a single sample. The multiple container multiplexing circuit **64** produces an output which is connected to the power switch **54** for stopping the power cycle. The multiple sample multiplexing circuit **63** provides an output which is directed to a stepper motor control **66** which provides for one step advancement of a filling arm to be hereinafter described. Multiple sample multiplexing circuit **63** also has its output connected to a step count circuit **67.** The output of step count circuit **67** is directed to the power switch **54** for inhibiting power turn-on after a predetermined number of steps have occurred. Two-cycle timer **57** has a purge and a fill signal included in each of the cycles. An additional input to timer **57** provides for terminating the fill signal and eliminating the second cycle output from two-cycle timer **57** prior to the end of the fill portion of the first cycle. A fill level probe **68** provides this last named input to timer **57.**

A mechanical description of one embodiment of the sampler may be seen in FIG. **4.** Sample chamber assembly **39** includes a cylindrical clear wall **71** having visible graduations **72** marked on the side. A vertically adjustable pipe **73** extends through a top cover **74** on cylinder **71** depending therefrom inside chamber **39.** Pipe **73** has an inverted U-shape and is connected to tube **22** leading to intake **19** on the end exterior of sampler chamber **39.** In this embodiment electrical contact means **76** is mounted within chamber **39** and is positioned therein to complete an electrical circuit through a contained sample. Contact means **76** functions to sense when the sample chamber **39** is filled to a predetermined level. Other well known means for sensing fill level, such as capacitive sensors, ultrasonic transmission characteristic sensors, or sample weight sensors for example, may be used in place of contact means **76.**

Sample chamber assembly **39** has a pressure inlet tube **77,** which in this case is electrically conductive, extending through a sample chamber base **78,** and encased in insulating material **79** within the chamber **39.** Insulating material **79** isolates pressure inlet tube **77** from the sample in chamber **39** up to the predetermined fill level, in this embodiment, so that electrical contact means **76** is not rendered ineffective by a fault circuit completion through structural parts of the sampler. The sensing circuit for predetermined fill level includes that portion of the pressure inlet tube **77** extending above insulating material **79.**

Inlet pressure tube **77** is in communication with a passage **81** through top cover **74** which leads into the interior of sample chamber **39.** A ball check valve **82** is positioned at the point where passage **81** enters sample chamber **39** at a level above the contact level for electrical contact means **76.** Means are provided for retaining top cover **74,** cylinder **71** and sample chamber base